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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,861	05/23/2001	Vetle Vinje	RR-482	9924

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EXAMINER	
LE, TOAN M	

ART UNIT	PAPER NUMBER
2862	

DATE MAILED: 08/12/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/863,861	Applicant(s) VINJE, VETLE	
	Examiner Toan M Le	Art Unit 2862	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 May 2001* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

Claims 1-12 are objected to because of the following informalities:

Claim 1, in line 11, "c h a r a c t e r i z e d b y", it is not clear what is the space between letters for.

Claims 2-6, in line 1, "c h a r a c t e r i z e d b y", it is not clear what is the space between letters for.

Claim 7, in line 16, "c h a r a c t e r i z e d b y", it is not clear what is the space between letters for.

Claims 8-12, in lines 1-2, "c h a r a c t e r i z e d b y", it is not clear what is the space between letters for.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanitzsch et al..

Referring to claims 1-2, Hanitzsch et al. discloses a method for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the method comprising: migrating to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), thereby achieving a real

depth migrated seismic cube $P_{Obs}(x)$ which is a function of the recorded traces that each has been given a weight $w_i(x)$ (col. 6, lines 3-5, 21-23, and 25-26); interpreting $P_{Obs}(x)$ to find the reflectors in the subsurface, based on these reflectors and the seismic velocities, an earth model is established in the computer, one of the reflectors in the earth model is chosen to be the target reflector (col. 5, lines 45-46 and col. 6, lines 6-9); computing synthetic traces from the target reflector for all shot/receiver pairs in the survey that was used in the step of migrating (col. 5, lines 45-46 and col. 6, lines 10-12); doing a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(x)$ (col. 6, lines 34-38); and measuring the amplitude along target reflector on the real PSDM cube $P_{Obs}(x)$, dividing these measurements by the corresponding measurements from the modeled PSDM cube $P_{Mod}(x)$, thereby obtaining an estimate of the angle dependent RC with corresponding reflection angle and weight function (col. 6, lines 13-14 and 29-33).

Hanitzsch et al. does not teach the step of setting the RC of the target reflector in the depth model to an essentially constant value or equals to 1 when the synthetic traces are computed.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have setting the RC of the target reflector in the depth model to an essentially constant value or equals to 1 when the synthetic traces are computed to make it necessary to calculate a very large number of weights to reduce the cost of computing.

As to claims 3-6, Hanitzsch et al. discloses a method for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the method is characterized by using the same weights $w_i(x)$ in the local PSDM in the step of migrating and modeling (col. 5, lines 4-12),

repeating the process of migrating and modeling for points along the target reflector to create a map of the RC for the target reflector (col. 6, lines 21-24), and computing the synthetic traces by ray tracing (col. 3, lines 52-59).

Hanitzsch et al. does not teach a method for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the method is characterized by using "square" method or "norm" method for measuring the amplitudes.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have used a variety of statistical methods like "square" or "norm" method to minimize the inaccuracy of the nominal value.

Referring to claims 7-12, Hanitzsch et al. does not disclose an article of manufacture comprising: a computer usable medium having computer readable program code embodied therein for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the computer readable program code in the article of manufacture comprising: computer readable program code for causing a computer to migrate to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), thereby achieving a real depth migrated seismic cube $P_{Obs}(x)$ which is a function of the recorded traces that each has been given a weight $w_i(x)$; computer readable program code for causing a computer to interpret $P_{Obs}(x)$ to find the reflectors in the subsurface, based on these reflectors and the seismic velocities, an earth model is established in the computer, one of the reflectors in the earth model is chosen to be the target reflector; computer readable program code for causing a computer to compute synthetic traces from the target reflector from all shot/receiver pairs in the survey that was used in the step of migrating; computer readable program code for causing a computer to set the RC of the target reflector in

the depth model to an essentially constant value when the synthetic traces are computed; computer readable program code for causing a computer to perform a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(x)$; and computer readable program code for causing a computer to measure the amplitudes along target reflector on the real PSDM cube $P_{Obs}(x)$, dividing these measurements with the corresponding measurements from the modeled PSDM cube $P_{Mod}(x)$, obtaining an estimate of the angle dependent RC with corresponding reflection angle and weight function; and computer program above characterized by setting the RC to 1 in the calculation of the synthetic traces, using the same weights $w_i(x)$ in the local PSDM in the step of migrating and modeling, using "square" or "norm" method for measuring the amplitudes, repeating the process of migrating and modeling for points along the target reflector to create a map of the RC for the target reflector, and computing the synthetic traces by ray tracing.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have incorporated the method described in the Hanitzsch et al. reference into a computer readable program code for simulating and cutting down the time in calculating the Reflection Coefficient of reflectors in the subsurface.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toan M Le whose telephone number is (703)305-4016. The examiner can normally be reached on Monday through Friday from 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703)305-4816. The fax phone numbers for the

organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-0956.

Toan Le

August 9, 2002

EDWARD LEFKOWITZ
SUPERVISORY PATENT EXAMINER
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